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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,620	07/31/2002	Sudipta Mukhopadhyay	RD-29161	8845
6147	7590	10/13/2006	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			HUNG, YUBIN	
			ART UNIT	PAPER NUMBER
			2624	

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/064,620	Applicant(s) MUKHOPADHYAY ET AL.	
	Examiner Yubin Hung	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-29 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-29 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment/Argument

1. This action is in response to amendment filed on 09/06/06. Claims 9 and 30 have been cancelled; claims 1-8, 10-29 and 31 are still pending.
2. Applicant's arguments filed 09/06/06 have been fully considered but they are not persuasive; see below.
3. **In remarks Applicant argued in substance:**
 - 3.1 *that Zanelli does not disclose selecting a portion of an image in a span of interest (P. 7, 2nd paragraph-lines 1-6 of 3rd paragraph and P. 7, 3rd paragraph, last 5 lines-P. 8, 1st paragraph)*

However, the location of the catheter relative to the image (e.g., of a heart) is of utmost interest to the user (see, for example, Col. 1, lines 44-48 of Zanelli), the portion of the image indicated by the location data of the catheter is considered the span of interest. Note also that Zanelli further discloses in column 10, lines 53-59 an alternate approach that specifies the coordinates of the catheter in the image, i.e., the portion of the image where the catheter is (the "span of interest") is indicated, or, in other words, selected. [See also Applicant's response in P. 7, 3rd paragraph, line 3.] Note further that such selection is done temporally [Zanelli: Col. 10, lines 25-27].

- 3.2 *that McGary teaches away from the claim recitations of applying compression to the selected portion of the image because it mentioned in the abstract that compression is done for non-target portions (P. 8, 2nd paragraph)*

However, McGary discloses in Col. 3, lines 32-37 (as cited in the rejection) that the target may be compressed.

- 3.3 *that there is no motivation in Zanelli or McGary to combine (P. 8, 3rd paragraph)*

However, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, a motivation that is in the knowledge generally available to one of ordinary skill in the art is provided in the rejection.

Claim Rejections - 35 USC § 103

(From Office Action mailed 06/06/06)

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 10-14, 20, 21, 23-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634).

6. Regarding claim 1, and similarly claims 12, 20, 24 and 31, Zanelli discloses

- selecting a portion of an image in a span of interest obtained from an acquired imaging sequence, wherein the selection comprises selecting both from a time sequence and a space sequence [Fig. 6; Col. 10, lines 21-52. Note that the catheter is the selected portion. Note further that per Col. 6, lines 9-11 and Col. 10, lines 25-27, the image is represented as I(x,y;z;t) with indicating the space sequence and t the temporal sequence]

Zanelli does not expressly disclose that the selected portion is losslessly compressed and decompressed.

However, McGary discloses losslessly compressing selected portions of an image sequence [Fig. 1, refs. 16-22; Col. 2, line 53-Col. 3, line 3; Col. 3, lines 23-35. Note that while decompression is not expressly disclosed, **Official Notice** is taken that it is well known and practiced by one of ordinary skill in the art to decompress compressed images in order to view or further process them.]

Zanelli and McGary are combinable because they are from the same field of endeavor of selecting image portion from an image sequence.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Zanelli with the teaching of McGary by applying lossless compression to the selected portion. The motivation would have been to reduce the storage requirement while preserving the ability to fully recover important portion (the selected portion) of the image sequence (as afforded by lossless compression).

Therefore, it would have been obvious to combine McGary with Zanelli to obtain the invention as specified in claim 1.

7. Regarding claims 2, 3, 10, and similarly claims 25, 26 and 28, Zanelli further discloses

(claims 2 & 26) wherein the portion of the image is a plurality of frames
in a span of interest

[Fig. 6; Col. 10, lines 21-52]

(claims 3 & 25) wherein the portion is at least one frame in a span of
interest

[Fig. 6; Col. 10, lines 21-52]

(claims 10 & 28) wherein selecting the portion of the image in the span of
interest comprises selecting the portion of image in a time
sequence

[Fig. 6; Col. 10, lines 21-52]

8. Regarding claim 11, and similarly claims 27 and 29, note that the ultrasonic image $I(x,y;z;t)$ of Zanelli is also a space sequence.

9. Regarding claim 13, Zanelli further discloses

- wherein the imaging device is a medical imaging device selected from a magnetic resonance imaging system, a computed tomography system, an x ray system, an x ray angiogram system and an ultrasound system
[Z: Fig. 6; Col. 10, lines 21-52]

10. Claim 14 is similarly analyzed and rejected per the analyses of claims 12 & 13 above.

11. Regarding claim 21, Official Notice is taken that ultrasonic images are usually fan-shaped (and therefore the selected image will be fan-shaped). [For example, see Koo et al. (US 5,846,203).]

12. Claim 23 is similarly analyzed and rejected as per the analysis of claim 1 and additionally the fact that lossy compression methods are well-known conventional compression methods. [For example, as admitted in paragraph 0002 of the application.]

13. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Scorse et al. (US 5,128,776).

14. Regarding claim 4, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 1.

Scorse discloses the following limitation that is not expressly disclosed in the combined invention of Zanelli and McGary:

- archiving the analytically relevant image sequence
[Fig. 1, ref. 34, 38; Col. 4, lines 20-22]

The combined invention of Zanelli and McGary is combinable with Scorse since they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Scorse by archiving relevant image sequence. The motivation would have been to have important data preserved for later use or review.

Therefore, it would have been obvious to combine Scorse with Zanelli and McGary to obtain the invention as specified in claim 4.

15. Regarding claim 7, Scorse further discloses

- wherein the user select option comprises manually marking frames of interest
[Fig. 1, ref. 18; Col. 4, lines 35-37]

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16. Claims 5, 6, 8 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Ransford et al. (EP 479,563 A2).

17. Regarding claim 5, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 1.

Ransford discloses the following limitation that is not expressly disclosed in the combined invention of Zanelli and McGary:

- wherein selecting the portion in the span of interest comprises having a user select option for selecting the portion of image
[Fig. 2, ref. 16; Col. 11, lines 8-28]

The combined invention of Zanelli and McGary is combinable with Ransford since they have aspects that are from the same field of endeavor of medical image processing (specifically, X-ray and ultrasound images).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Ransford by having a user select the portion. The motivation would have been to improve the usability of the system by giving the user greater control.

Therefore, it would have been obvious to combine Ransford with Zanelli and McGary to obtain the invention as specified in claim 5.

18. Regarding claims 6 and 8, Ransford further discloses

- (claim 6) wherein the user select option comprises segmenting an identifiable anatomy of a patient
[Col. 11, lines 28-32]
- (claim 8) wherein the user select option comprises sketch-gripping an image boundary
[Col. 11, lines 28-32]

19. Regarding claim 22, the combined invention of Zanelli and McGary discloses all limitations of its parent, claim 21. In addition, Ransford further discloses that the selection is done using manual means [Col. 11, lines 12-21].

20. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Flower et al. (US 6,351,663).

21. Regarding claim 15, Zanelli and McGary disclose

- selecting a plurality of frames of interest in a span of interest; applying lossless compression to the plurality of frames of interest and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence
[Per the analysis of claim 1]

Zanelli and McGary do not expressly disclose that the frames are obtained from an x-ray angiogram and that selecting the plurality of frames of interest comprises selecting at least two time instances and capturing the frames of interest between the two time instances.

However, Flower discloses capturing x-ray angiograms (i.e., image frames) and comparing a series of angiograms over a time period (i.e., between two time instances) for diagnostic purpose [Col. 1, lines 34-60].

The combined invention of Zanelli and McGary is combinable with Flower since they have aspects that are from the same field of endeavor of image acquisition.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Flower by using x-ray angiograms over a time period (for diagnostic purpose). The motivation would have been because such images are frequently acquired in medical procedures and the reduction of the size (by compression) of the subset of those images (useful for diagnostic purpose) can save the storage cost.

Therefore, it would have been obvious to combine Flower with Zanelli and McGary to obtain the invention as specified in claim 15.

22. Regarding claim 16, it would have been obvious to one of ordinary skill in the art at the time of the invention to select one time instance when a dye appears and a second time instance when the dye disappears since only images captured during the presence of the dye are useful (as column 1, lines 44-48 of Flower clearly suggests).

23. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) as applied to claims 1-3, 10-14, 20, 21, 23-29 and 31 above, and further in view of Chui et al. (US 5,841,473).

24. Regarding claim 17, the combined invention of Zanelli and McGary discloses

- selecting a plurality of frames of interest; applying lossless compression to the plurality of frames of interest and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence
[Per the analysis of claim 1]

The combined invention of Zanelli and McGary does not expressly disclose that the frames are obtained from an MRI device.

However, Chui discloses compressing MRI image sequences [Col. 6, lines 36-44].

The combined invention of Zanelli and McGary is combinable with Chui since they have aspects that are from the same field of endeavor of image compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli and McGary with the teaching of Chui by compressing MRI image sequences. The motivation would have been because such

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images are frequently acquired in medical procedures and the reduction of their size (by compression) can save the storage cost.

Therefore, it would have been obvious to combine Chui with Zanelli and McGary to obtain the invention as specified in claim 17.

25. Regarding claim 18, note that manually selecting frames is well known and practiced in the art. [For example, per the analysis of claim 7, Scorse discloses manual selection of the frames of interest.]

26. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zanelli (US 6,515,657) and McGary (US 5,521,634) and Chui et al. (US 5,841,473) as applied to claims 17 and 18 above, and further in view of Reinsch (US 5,134,661).

27. Regarding claim 19, the combined invention of Zanelli, McGary and Chui discloses all limitations of its parent, claim 17.

The combined invention of Zanelli, McGary and Chui does not expressly disclose that the frames of interest in a space sequence are automatically selected using edge detection.

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However, Reinsch suggests using edge detection to select areas of interest. [Abstract: lines 1-9.]

The combined invention of Zanelli, McGary and Chui is combinable with Reinsch since they have aspects that are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zanelli, McGary and Chui with the teaching of Reinsch by using edge detection to select areas of interest. The motivation would have been because edge detection produces edge points that can be processed to obtain the contours of regions of interest.

Therefore, it would have been obvious to combine Reinsch with Zanelli, McGary and Chui to obtain the invention as specified in claim 19.

Conclusion and Contact Information

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Ida et al. (US 2005/0111739) -- discloses a method for extracting and compressing a portion of interest from an image for transmission [Fig. 27 and paragraph 193]
- Martin (US 6243131) -- discloses a method for extracting and compressing a portion of interest from an image for transmission [Fig. 1 and Col. 6, lines 31-37]
- Roman (US 2002/0196848) -- discloses a method for extracting and compressing a portion of interest from an image for transmission [Paragraph 31]
- Dekel (US 6314452) -- discloses a method for user specifying ROI for extraction and compression for progressive transmission [Fig. 2 and Col. 4, line 51-Col. 5, line 54]

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1:136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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October 9, 2006



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